

REDISCOVERY AND STATUS OF *ADIANTUM WHITEI* BAILEY (ADIANTACEAE)

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Summary

Adiantum whitei Bailey (Adiantaceae), formerly recorded from a few localities in south-eastern Queensland, is now known to have a wider range in north-eastern Australia. The receptacle of this taxon bears thick-walled trichomes, a condition not previously reported for the genus. *A. whitei* is reduced to varietal status under *A. hispidulum* Sw.

The original collections of *Adiantum whitei* were from Kenmore, a western suburb of Brisbane. Other contemporary collections came from the nearby suburbs of Indooroopilly and Enoggera, Lawnton (One Mile Creek) ca 16 km north of Brisbane and Maryborough ca 215 km north of Brisbane. The last collection (other than cultivated specimens) appears to have been from Kenmore in December 1931 (AQ142926, BRI).

Recent collections of *Adiantum* taxa include a robust tripinnate fern collected 9 km SW of the type locality (State Forest 494 Moggill, Bostock 190, BRI) which matches one of the syntypes of *A. whitei* (Kenmore, May 1915, White AQ24496 (BRI)). A collection from ca 6 km NE of the type locality was subsequently propagated from its spores (R.Hill, pers.comm.). The descendants have been distributed under the horticultural names *Adiantum* aff. *whitei* and *Adiantum* sp. 'S.E. Qld'. More recently *A. whitei* has been found to be common along creeks in the southern and western parts of Brisbane and specimens now in cultivation in Brisbane are reputed to have come from as far afield as Mt Spec ca 1500 km north of Brisbane (C.Ritchie, pers. comm.).

A revised description of *A. whitei* is given here, based on specimens examined by the author.

Rhizome short-creeping, semi-erect, stoloniferous; scales concolorous, with entire margins and acuminate apex. Fronds approximate, occasionally remote, to 60 cm long. Lamina to 30 cm long, 20 cm broad, triangular, 2- to 3-pinnate, herbaceous to coriaceous. Rachides invested with antrorse red-brown hairs. Pinnae numerous, narrow-triangular, simply pinnate in their apical half. Ultimate segments symmetric and cuneate-flabellate becoming dimidiate and rectangular to trapeziform towards apices of pinnae and lamina; distal margins shallowly lobed, dentate when sterile; segment surfaces invested with numerous short pale trichomes (to ca 0.4 mm long) and a few similar but longer ones, denser abaxially. Indusia crowded, 1 to 4 per lobe, oblong to subrectangular, joining the segment margin proper at a narrow sinus, bearing on their outer surface numerous dark brown uniseriate thick-walled trichomes, which are also scattered among the sporangia. Spores with minutely granulate perine adhering rather loosely to the exine. **Fig. 1.**

Recent authors (Jones & Clemesha 1981, Elliot & Jones 1982, Goudey 1985) have speculated that *A. whitei* is a hybrid. Jones and Clemesha (1981) and Goudey (1985) proposed *A. hispidulum* Sw. and *A. formosum* R.Br. as putative parents. Little evidence is offered in support of this statement, although Goudey (1985) lists a number of morphological characters of *A. whitei* which are common to one or other of these species.

In his original description and accompanying illustration, Bailey describes the rhizome of *A. whitei* as 'creeping'. Investigation of the new collections has shown that the 'creeping' rhizome is a stoloniferous branch that on occasion bears fronds spaced a few centimetres apart. The apices of mature stolons bear a tuft of fronds indicating reversion to a short-creeping rhizome. In this respect, the rhizome ramification of *A. whitei* is similar to that of both *A. hispidulum* and *A. aethiopicum* L., another taxon

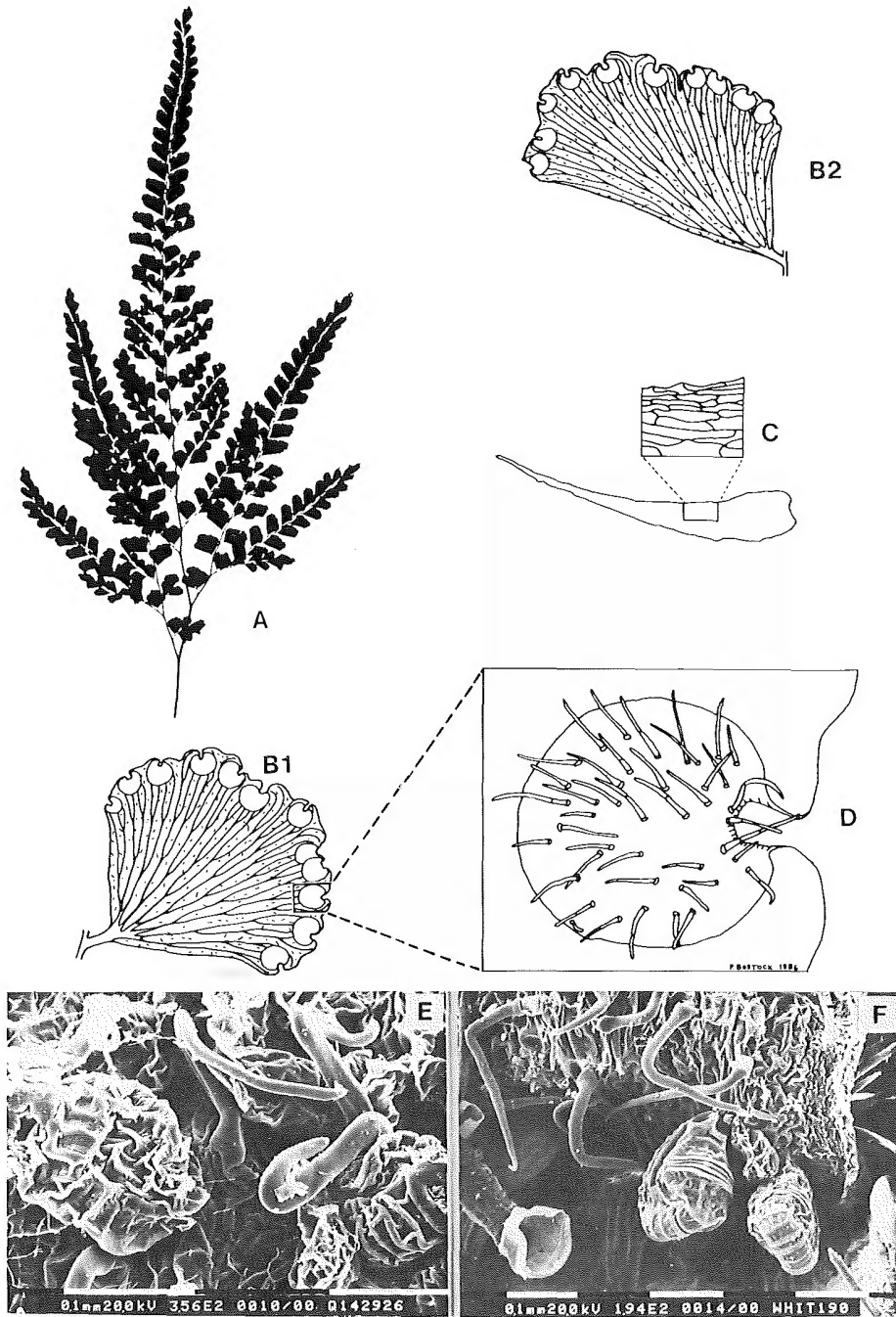


Fig. 1. *Adiantum whitei*: A. silhouette of frond (Bostock 218) $\times 0.4$. B. ultimate segments (middle of frond) (Bostock 190) $\times 3.5$. C. indusium (Bostock 190) $\times 40$. D. rhizome palea (Bostock 246) $\times 35$. E & F. scanning electron micrographs of abaxial indusial surface. E. Blake, Dec 1931, AQ142926. F. Bostock 190. (scale for E and F indicated on plates.)

widespread in eastern Australia, but differs markedly from the robust much-branched system of *A. formosum*. The symmetric and cuneate-flabellate ultimate segments of *A. whitei* are reminiscent of those of *A. formosum* and *A. aethiopicum*. However, *A. hispidulum* also bears segments of a similar form, as in the small accessory pinnae between the major bifurcations of the rachides in pedate forms, or in many (sometimes the majority) of the ultimate segments in pinnate forms. *A. hispidulum sens. lat.*, which is found from eastern Africa, through India and Malesia to Australia and the western Pacific (Parris 1980), is a variable taxon. The form which occurs in drier areas in north-eastern Australia has pedate, sub-pedate or pinnate-bipinnate fronds, with texture and indumentum of the lamina as described above for *A. whitei*. It is this form which occurs in areas where *A. whitei* has been collected, and which is referred to in the remainder of this discussion. The range of frond forms which occur in *A. whitei* and *A. hispidulum* are shown as silhouettes in Fig. 2.

Indusia of *A. whitei* (Fig. 1C) are morphologically identical to those of *A. hispidulum* in shape, location on the segment and nature of the trichomes investing the outer surface. Additionally, most specimens of *A. whitei* have been found to possess hook-shaped trichomes among the sporangia (Fig. 1E-F). Indusia of *A. hispidulum* occasionally bear trichomes just under their margins but trichomes have not been found to arise from receptacular tissue. The genus *Adiantum* is usually recorded as non-paraphysate (e. g. Tryon & Tryon 1982), although Nayar (1961) recorded club-shaped paraphyses for material identified as *A. tenerum* Sw. The observation of receptacular trichomes reported here is the first for the genus, and may be regarded as diagnostic of the taxon regarded as *A. whitei*.

A. whitei and *A. hispidulum* cannot be separated by using any of the following characters: rhizome scales (*A. whitei*, Fig. 1D); lamina texture; rachis indumentum or texture; spore ornamentation; rate of spore germination (tested at room temperature (12–24°C) with indirect natural lighting). They have similar ecological requirements, and are generally found in close proximity, although *A. whitei*, which grows mainly in the vicinity of watercourses appears to be less tolerant of dry conditions than *A. hispidulum*, which is often found in relatively sheltered places considerably distant from streams.

On the basis of the above evidence, *A. whitei* Bailey is here reduced to the status of a variety of *A. hispidulum* Sw.

***Adiantum hispidulum* Sw. var. *whitei* (Bailey) P. Bostock stat. nov.**

Adiantum whitei Bailey, Queensland Agric. J., n.s. 4: 39 & t. 5 (1915). **Lectotype** (designated here): Kenmore, Qld, May 1915, *White* AQ24496 (lecto: BRI; isolecto: NSW).

Specimens Examined. Queensland. MORETON DISTRICT: Kenmore, May 1914, *White* AQ142924; Kenmore, Jul 1914, *Young & White* AQ142928; Enoggera, May 1916, *White* AQ142927; Brisbane R., Indooroopilly, Feb 1916, *Young & White* AQ142929; One Mile Ck, Lawnton, *Blake* AQ142925; Kenmore, Dec 1931, *Blake* AQ142926; Maryborough district, *Young* AQ142923; University Bushhouse [Brisbane], Dec 1937, *Goy* AQ142930; S.F.494 Moggill, Brisbane, *Bostock* 159, 184, 189, 190, 218, 246, 252; garden plant, The Gap, Apr 1986, *Bostock* 225; cultivated plant ex Mt Spec, NNW Townsville, Apr 1986, *Ritchie* s.n.; cultivated plant ex base of Mt Petrie, Brisbane, Apr 1986, *Peach* s.n. (all BRI).

Agamospory in the *A. hispidulum* complex

The source of taxonomic confusion in many fern species may be shown to result from agamospory. Thus the spores contain the unreduced parental chromosome complement and sporophytes arise directly from gametophytic tissue. Archegonia are absent from the gametophytes although functional antheridia are usually present (Walker 1983). This is the situation with *Adiantum caudatum* L. *sens. strict.*, which is a member of a complex consisting of at least seven taxa (Lovis 1977).

Agamospory has also been reported as the normal state in *A. hispidulum* (Manton & Sledge 1954, Abraham et al. 1962, Ghatak 1977, Bidin 1983). The sole exception is Brownlie (1957, 1965) who reported only meiotic chromosome counts. At least 4 cytotypes have been identified in *A. hispidulum* (Walker 1983), but detailed studies linking morphology and cytology in the taxon are not available.

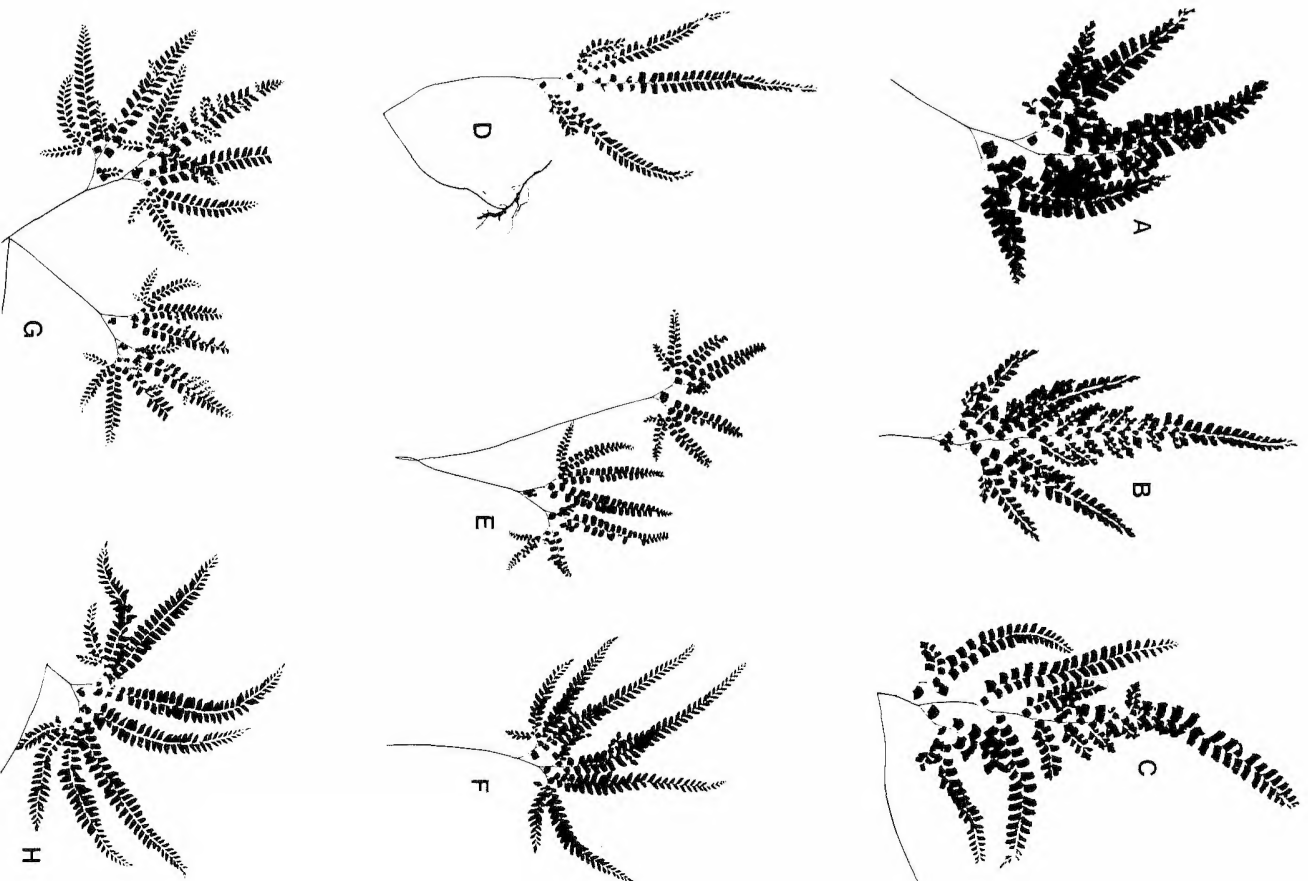


Fig. 2. Silhouettes (not to scale) showing frond forms in *Adiantum whitei* and *A. hispidulum* in Queensland: A-C, *A. whitei* sens. str. A, Bostock 190, B, Bostock 218, C, cultivated ex Mt. Spec NNW of Townsville, Riche s.n. D-H, *A. hispidulum* sens. lat. D, Bostock 235, E, Bostock 251, F, Bostock 245, G, Bostock 250, H, Bostock 151.

In all investigated cases of hybrids between apomicts and sexual species (where the apomict must be the male or antheridial parent), the offspring have been apomictic (Walker 1979, 1983, 1985). The production of fertile spores by *A. whitei* is not unexpected, even if the taxon should prove to be a natural hybrid between *A. hispidulum* and another (sexually reproducing) *Adiantum* taxon. Walker (1985) commented on the ability of agamosporous taxa to build up extensive agamic complexes in this manner and the possibility that *A. whitei* has its origins in such an event (or events) cannot be discounted.

The numerous morphological similarities between *A. hispidulum* and *A. whitei* indicate a common ancestry, but the latter taxon is sufficiently distinguished by virtue of its frond dissection and receptacular trichomes to be given varietal status.

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